Light and Lighting

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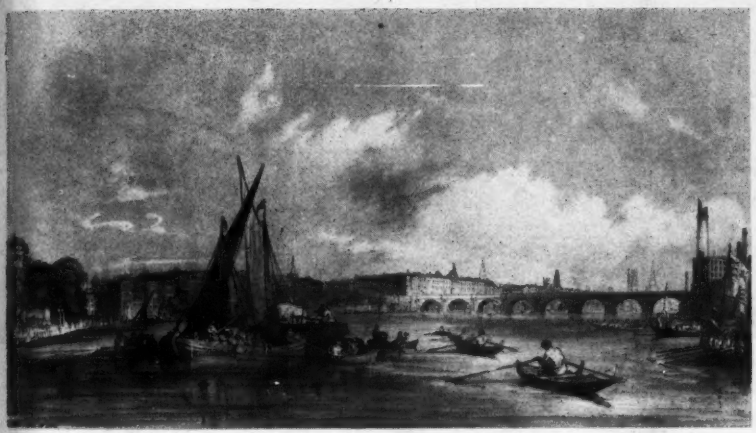

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Water under the Bridge

A lot of water has flowed under Waterloo Bridge since Parrott made this drawing in the 1840's, and what would then have seemed idle dreams are now accepted as an everyday part of our lives.

Of all the vast improvements that have been made, none has been more remarkable than electric lighting. From the insufficient, poor quality light of the early days, research scientists in the laboratories of E.L.M.A. Members have developed it until today modern artificial light can well compare with daylight. Added to that, its cost per unit of electricity has been constantly reduced and good lighting is now within the economic reach of everyone.

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CONTENTS

	Page
Editorial Notes... ...	157
Notes and News ...	158
The International Commission on Illumination	161
Courses in Illuminating Engineering	176
Obituary (Sir Clifford Paterson)	177
The Editor Replies ...	178

The International Commission on Illumination

THE work of the International Commission on Illumination has suffered a number of set-backs since its formation many years ago. International relations were suspended during the first world war, and a gap of nine years between successive meetings was caused by the 1939-45 war.

In spite of these obstacles the work has continued and the Eleventh Session, which was recently held in Paris and to which reference is made elsewhere in this issue, was attended by a record number of delegates and its primary function of getting people together again was admirably fulfilled. To quote from a B.B.C. broadcast on this event the delegates "achieved a degree of practical co-operation that is refreshing these days."

Illumination Notes and News

A.P.L.E. Annual Conference

Particulars are now to hand of the forthcoming Annual Conference of the Association of Public Lighting Engineers, which is to take place in Eastbourne during September 13-17. On the opening day the Conference will be officially opened by the Mayor of Eastbourne, and the new President (Mr. N. Boydell) will be inducted. Thereafter meetings will take place in the Winter Garden Conference Room, and there will be an exhibition of street lighting equipment in the Pavilion. The Conference Luncheon (September 15) will be at the Grand Hotel, which is to serve as the Headquarters of the Association.

An interesting series of papers has been arranged, dealing with "Unidirectional Lighting of Dual Carriageways and Side Roads" (J. S. Smyth); "Street Lighting in the vicinity of Aerodromes" (S. English and J. G. Holmes); "Basic Principles in the Design of Street Lighting Installations" (D. M. Thompson); "One Hundred Years of Research and Development in Electric Light" (J. N. Aldington), and "Safety First on the Highways" (Charles N. Melton).

A reception by the President and various social events are also included in the programme.

It will be recalled that the Association not long ago suffered the loss of its secretary, Mr. H. O. Davies, who had been identified with its progress for many years. We note, however, that his place has been filled by Mr. Eric Evans, from whom further particulars of the Conference may be obtained. The address (68, Victoria-street, Westminster, S.W.1) is unchanged.

Example and Precept

In our last issue we noted with approval the promised increase in the permissible consumption for street lighting from 50 to 75 per cent. of the pre-war value. It does not look, however, as though there is much hope of brighter shop-windows—indeed, we gather from a recent reference in the Press that shops (and offices) are to be asked to cut their peak electricity loads (presumably interior lighting) by 20 per cent. during December, January, and February. It appears that the effect last winter on some people of seeing shops thus "fully lit"(?) was bad, in the sense that it stimulated them to light up their homes also. Thus, in the strange conditions in which are now living, the natural aim of the illuminating engineer, to improve lighting by force of example, is frowned upon. It is the laggard in lighting who receives praise.

U.S.A. "Lighting Manual"

Readers are familiar with the Lighting Handbook issued by the American I.E.S., which has been recently reviewed in our columns. This is a very comprehensive production, very much larger than the textbook written by Dr. J. W. T. Walsh, which serves as a guide to the City and Guilds examinations in illuminating engineering in this country. We notice, however, that the essence of the American publication is now to be condensed into a much more compact book to be known as the "I.E.S. Lighting Practice Manual." This, too, should prove a useful production.

Another interesting step in prospect is the publication of an "official journal," which is to make its appearance at the beginning of 1949. Although not a great deal has been said in regard to its scope and appearance, we gather it is to serve as a sort of popular supplement to *Illuminating Engineering*, in which the American Society's Transactions appear in full —it will, in fact, have functions somewhat similar to those of *Light and Lighting*.

Milestones

We notice in the *I.E.S. Lighting Review* a note under the above title, reviewing the recently delivered address of the President of the American I.E.S. An attempt is made to select the ten greatest advances in lighting of the past ten years. It is remarked, truly enough, that probably no ten people would agree in this selection—certainly they would be even less likely to place them in the same order. In this case the concrete advances figure first in the order — anodised aluminium, tempered glass, plastics, fluorescent lamps, and reflector lamps (as used in sealed beam headlights). After this we come to advances in knowledge of applications of light, such as interreflection methods to predict brightness levels, studies of lighting in industry and the "Better Light—Better Sight" movement. Notable in this section is the recognition given to "British studies in visual performance under the auspices of the Medical Research Council," which appears seventh on the list.

I.E.S. Meetings and Visits

It is understood that the programme of I.E.S. meetings in London and in the provinces for the session beginning next October is now nearly completed and will be published shortly.

The London programme includes, in addition to the usual eight sessional meetings, four informal meetings and four visits. The sessional meetings will as usual be held on the second Tuesday of each month during the session, but it should be noted that the informal meetings have been arranged to take place on Wednesdays (December 8, January 26, March 23, and April 27). The visits include the B.T.H. Research Laboratories at Rugby, Southampton Docks, a London theatre, and a visit to a glassworks.

The visit to the Research Laboratories of the B.T.H. will take place on Thursday, October 21. The party will be limited to 50 in number and will leave Euston station at 10.50 a.m., arriving in Rugby at 12.32. The B.T.H. Co. have kindly arranged to provide luncheon and tea. The tour of the laboratories will include the Lamp, Lighting and associated sections. After tea a tour will be made by motor coach of fluorescent, mercury and sodium street lighting installations. The party will leave Rugby at 7.10 p.m., arriving back at Euston at 8.50.

I.E.S. members wishing to take part in this visit should make application to the secretary as soon as possible.

Adaptation to Coloured Lighting

At the fortieth meeting of the Colour Group, held at the E.L.M.A. Lighting Service Bureau on June 9, Mr. R. W. G. Hunt, of Kodak Ltd., who is working at the Imperial College in close association with Dr. W. D. Wright, gave an interesting account of some work he had recently carried out on the way in which the eye became adapted to the colour of the general illumination to which it is exposed. He made use of the well-known binocular matching apparatus to measure the extent to which the colour sensation corresponding to a given light was changed by any alteration in the colour of the adapting field. The changes observed were measured quantitatively in terms of colour-matches made with the dark-adapted eye. Most colours appeared much more saturated to the light adapted than to the dark adapted eye and small changes of hue were found as well.

Mr. Hunt illustrated his lecture with a number of interesting demonstrations and he put forward a tentative explanation of the way in which the observed effects might be produced in the visual process. This involved interaction, especially under conditions of dark adaptation, between the three colour mechanisms postulated on the usual theory of colour vision. Further, the form of the adaptation and recovery curves plotted against time seemed to indicate that the processes occurring were more photo-chemical than electrical.

It was interesting to compare the results of Mr. Hunt's work with those recently reported by A. A. Kruithof in Holland who experimented with the colour names which were assigned to cards of the Ostwald colour atlas by observers viewing these cards under different systems of illumination, especially fluorescent lighting. He found that, presumably due to colour adaptation, there was remarkably little change in the apparent colour of objects seen under light of different colours.

Award to Sir Clifford Paterson

It was announced in our May issue that the American I.E.S. had this year awarded their Gold Medal for meritorious achievement in illuminating engineering to Sir Clifford Paterson, the first occasion on which the medal has been awarded to a foreigner.

It was hoped that the medal would be presented to Sir Clifford during the I.C.I. meeting in Paris, but, owing to Sir Clifford's illness, this was not possible The presentation was, therefore, made to Lady Paterson by Mr. Preston Millar, a Past-President of the American I.E.S., on July 22 at the Paterson home at Watford.

The medal bears the inscription, "To honour Sir Clifford Copland Paterson, who, by distinguished contribution, has conspicuously furthered the art, knowledge and profession of Illuminating Engineering."

It is with the deepest regret that we have to record the death of Sir Clifford on July 26. A tribute to Sir Clifford appears elsewhere in this issue.

I.E.S. Manchester Centre; Forthcoming Luncheon

Following a most successful luncheon held by the Manchester Centre of the I.E.S., under the chairmanship of Mr. J. H. Morrison, at the Engineer's Club, Manchester, on April 28 last, the Centre have now made arrangements to start the new session with a similar, though more formal, function to be held at the Midland Hotel, Manchester, on Thursday, October 14 next.

At this meeting the guest of honour will be the Lord Mayor of Manchester and an address will be given by the new I.E.S. President, Mr. J. M. Waldram. The reply to the toast of "The Guests" will be made by Dr. W. J. Wellwood Ferguson, who will also be lecturing to the Centre on "Colour" later in the day.

Under the very active guidance of Mr. Alan H. Owen, who was formerly secretary of the Centre, and now under Mr. W. E. Ballard, the Centre has reached a membership of over 140. The attendance at the luncheon in April was 90 and there is every indication that the function in October will be attended by an even greater proportion of the Centre membership.

The International Commission on Illumination

An Account of the 11th Session of the Commission, which was held in Paris from June 29 to July 7.

By G. F. COLE

Although the commission normally meets every three or four years, owing to the recent war this was the first meeting since that held at Scheveningen, Holland, in 1939. During the intervening period contact has, of course, been lost with a number of countries who had formerly taken part in the work of the commission. In spite of this, however, the number of delegates at the Paris meeting was a record, there being over 400 from Belgium, Canada, Czechoslovakia, Denmark, France, Germany, Great Britain, Hungary, Italy, Holland, Norway, Palestine, Sweden, Switzerland, Turkey, and the United States of America.

This record attendance shows that the increasing interest in lighting matters which is apparent in this country is shared by other nations. As Dr. Halbertsma said in his address to the I.E.S. last year, it may well be true that illumination is far above rivalry, jealousy and sensitivity, which so often interfere with international relations. All those who were present in Paris can confirm that it is possible for the representatives of nations to get together with the most friendly spirit and to produce results.

The largest single delegation, apart from the French, was that from this country, the representatives being:—

R. O. Ackerley, J. N. Aldington, W. A. Allen, L. G. Applebee, A. D. S. Atkinson, S. F. Baker, R. Birt, J. P. Bowen, N. Boydell, W. H. Butcher, E. S. Calvert, J. B. Carne, G. F. Cole, R. Crawford, L. J. Davies, L. H. McDermott, R. Donaldson, W. E. Drake, S. English, V. J. Francis, W. T. Gemmell, H. F. Gillbe, H. Gough, P. Griffiths, W. Hadfield, W. Harrison, F. J. Hawkins, A. G. Higgins, J. G. Holmes, R. G. Hopkinson, R. G. Horner, J. N. Hull, W. J. Jones, R. H. Mealing, E. Morgan, J. H. Nelson, A. G. Penny, C. W. M. Phillips, W. E. Rawson-Bottom, H. R. Ruff, J. L. Russell, A. L. Salway, F. W. Sansom, E. B. Sawyer, F. W. Sharpley, W. D. Sinclair, W. R. Stevens, W. S. Stiles, P. C. Sugg, J. M. Waldram, J. W. T. Walsh, A. G. Watson, W. J. Wellwood-Ferguson, H. C. Weston, W. H. Willmott, G. T. Winch, J. T. Wood, N. W. Wood, and W. D. Wright.

Sir Clifford Paterson was unfortunately unable to be present and the duties of honorary secretary to the executive committee were carried out by Dr. Walsh. As it was originally intended that Dr. Walsh would be leader of the British delegation, Dr. English was elected to this position. It was also unfortunate that Mr. J. S. Preston, who had done so much work as general secretary of the commission, was prevented by illness from being present. His absence was noted by all and tribute to his work was paid by Dr. Halbertsma and others.

Organisation of the I.C.I.

Before giving an account of the Paris meeting it might be as well to recall the organisation on which the commission is built. This was dealt with most excellently by Dr. Halbertsma in the address* to which reference was made above but briefly the history and organisation of the I.C.I. is as follows. It was first formed as the International Photometric Commission in 1903, but it soon became apparent that as such it dealt with only a fraction of the problems involved in the field of lighting and so it broadened its scope and became the I.C.I. in 1913. Owing to the first world war its first meeting could not be held until 1921 and as the I.C.I. were the successors of the I.P.C. this was called the fifth session. Since then meetings have been held in various countries; in 1924 (Switzerland), 1928 (U.S.A.), 1935 (Gt. Britain), 1935 (Germany), 1939 (Holland), and now the eleventh session has been held in Paris. In addition to these sessions an intermediate technical meeting was held in Italy in 1927.

The objects of the commission have undergone small changes from time to time and they are now stated as being (1) to provide an international forum on all matters relating to the art and science of illumination, (2) to promote the study of lighting matters, (3) to provide for an interchange of information

* Trans. Illum. Eng. Soc. (London), Vol. XII, No. 5. 1947.

between countries, and (4) to agree upon and to publish international *recommendations*. The last word here is stressed, as the I.C.I. have no mandatory authority, but through the various national illumination committees they make recommendations which the N.I.C.s put before the national bodies responsible for each individual matter in an effort to get such recommendations adopted by as many countries as possible. The primary function of the I.C.I. is not, however, standardisation but the discussion and dissemination of scientific and technical information.

The organisation of the I.C.I. is based on the existence of the national committees which appoint sub-committees to study various subjects. Each country which is a member of the Commission undertakes the responsibility for conducting research or collecting information on one or more subjects both from within their own country and by contact with the other member countries. Such information is compiled into reports which are presented at the periodical meetings of the Commission. In addition to these reports papers may also be presented at the sessional meetings.

The reports themselves are most valuable documents and together with the papers, etc., are published some time after the sessional meetings. To be of the greatest value at the actual meetings, however, it is essential that they should be prepared and distributed well in advance in order that delegates may have time to give them careful study and so come to the conference prepared to discuss them with the attention and detail they deserve. At Paris the majority of the reports were available only shortly before the meetings; in fact, some of the printed reports did not arrive from the secretariat countries at all and had to be hurriedly duplicated by the already hard pressed secretariat staff. Time was, therefore, inevitably spent at the meetings in going through some of the reports in detail, the time available for discussion being curtailed as a result. The special difficulties of collecting reports and getting them printed are, of course, appreciated, but it is to be hoped that in future reports will be available in good time as they were in the past.

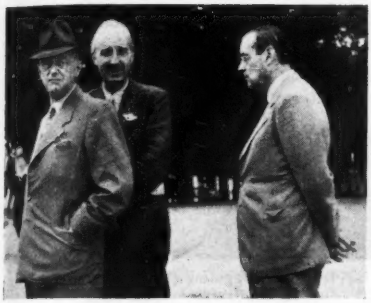
One feature of the reports was the very detailed bibliographies which were included in many of them. In view of the present demand for lighting literature, which has been caused largely by the break in contact between countries since 1939, these very detailed reference lists will be found most valuable.

The Opening Meeting

The opening meeting was held at the Sorbonne at 10.30 a.m. on Wednesday, June 30, in the Richelieu Amphitheatre which was packed to capacity, the chair being taken by M. Louis de Broglie, holder of the Nobel Prize for Physics and a member of the Academie Francaise. An address of welcome was given by M. Maurice Leblanc, President of the French Committee for Lighting and Heating, after which M. Louis de Broglie gave a talk on the principles of fluorescence. Dr. N. A. Halbertsma, President of the I.C.I., then gave a number of demonstrations on the application of fluorescence to lighting, and the meeting concluded with a short film on the life of the late Prof. Charles Fabry, who was President of the Commission at the tenth session in 1939.

Delegates leaving the Sorbonne after the opening session.

The programme of technical meetings which were held during the next six days was arranged so that as far as possible subjects which had some common ground did not clash. In the following account the various subjects are dealt with under



Members of the delegation from Germany. *L. to R.* Dr. Meyer, Dr. Dresler and Dr. Schneider.

the groupings given to them by the I.C.I., i.e., Photometry, Sources and Accessories, Applications, Ultra-violet and Miscellaneous.

Photometry

The first committee under this section is that on *Vocabulary*, a report on which was prepared by the Swiss. A number of suggested amendments to the International Lighting Vocabulary, which was published by the I.C.I. in 1938, had been submitted by several countries, e.g., the definition of "brightness" and "intensity," and were referred to a committee of action charged with the preparation of the second edition of the vocabulary. The committee is comprised of Dr. J. W. T. Walsh (U.K.), Prof. P. Fleury (France), Prof. H. Konig (Germany) and one representative of the secretariat committee (Switzerland). The committee is also asked to make contact with astronomers to unify the different photometric terminologies of the two sciences.

The committee on *Definitions and Symbols* (France) had as their main task the selection of a name for the "new candle,"* and it was recommended that it should be called the "candela," with the symbol "cd."

The report of the *Light and Vision* committee (France) was confined to a brief account of progress with regard to certain physiological effects of light in as far as they are of interest to the lighting engineer, e.g. aberrations of the visual mechanism, night vision, colour adaptation, etc. The report also includes a valuable bibliography of 354 references. At this meeting two papers were presented jointly by two members of the Netherlands delegation, MM. H. A. van de Velden and N. A. Bouman, the first on a "New Theory for Intensity Discrimination," the other on "The Two-quanta Theory" which was a very good explanation of the behaviour of threshold values for the various kinds of receptor.

The committee recommended that study be made to determine a standard spectral sensitivity curve for the dark adapted eye. It was thought that the curve should be based on the recent work of Wald and Crawford, the object being to lay down a curve which corresponds as nearly as possible to the response of the so-called "rod mechanism" in the extrafoveal retina (not nearer than 5 degrees from the centre of the fovea) of the average young subject (i.e., less than 30 years of age). It was also suggested that attention might be given to finding a correction factor to allow for the change of the curve with increasing age.

On *Visual Photometry* (France) the report dealt with the manufacture and study of standard lamps, the comparison of lamps of the same colour, and the results of recent work on heterochromatic visual photometry. Mention was also made of methods adopted in practice for measuring low brightness, and a fairly extensive bibliography is included. One of the recommendations of this committee was that the question of standardising the size of the exit

Dr. N. A. Halbertsma and Mr. I. Weber (Denmark).

* See LIGHT AND LIGHTING, July, 1947, p. 122.

M. Maurice Leblanc, chairman of the French National Committee, and Mme. Leblanc.

Mr. Van Diggelen (Holland), and Mr. F. C. Breckenridge (U.S.A.).

pupil of visual photometers be studied.

The report on *Physical Photometry* included a long bibliography of nearly 500 items. There were several recommendations on this subject, including (i) that the relative accuracy of various methods of physical photometry for precision work should be given further study to establish a preferred technique for heterochromatic photometry which will give results strictly in accordance with the C.I.E. (1924) Standard Luminosity Curve; and (ii) that a special study should be made of the relative merits of methods of achieving "average eye" spectral response, including the accuracy which can be obtained when calibrating by reference to tungsten filament standard lamps, and measuring the intensity and lumens of electric discharge lamps.

Colorimetry and Artificial Daylight was covered in a report made by the United States. This also gave a very comprehensive list of references. It dealt, amongst other things, with the suggested standard illuminant E, which has already been adopted in Germany, in place of the standard illuminants B and C, neither of which, it is claimed, represents a generally satisfactory artificial daylight. It was decided, however, not to adopt the new illuminant either for the photometry of non-self-luminous objects or as a standard of artificial daylight. The report also discussed illuminants for colour matching, the specification of colour-rendering properties and colour discrimination.

The recommendations, which were rather lengthy, also stated that the colour and colour-rendering properties of illuminants should be measured and expressed in terms of (i) the C.I.E. chromaticity co-ordinates, and (ii) luminance (i.e., the new term for photometric brightness) in agreed spectral bands as follows:—

Spectral Band No.	*Wavelength Limits* (μ)
1	0.38 to 0.42
2	0.42 „ 0.44
3	0.44 „ 0.46
4	0.46 „ 0.51
5	0.51 „ 0.56
6	0.56 „ 0.61
7	0.61 „ 0.66
8	0.66 „ 0.76

It was also recommended that further study should be given to appraising colour-rendering properties, including confirmation of the optimum spectral band intervals to be used. Certain changes in colorimetric terminology were recommended.

Two papers were presented at this meeting by members of the British delegation, (i) "Flourescent Lamp Artificial Daylight Units for Colour Matching," by G. T. Winch, W. Harrison, and H. R. Ruff, and (ii) "Measurement, Representation, and Specification of Colour and Colour Rendering Properties of Light Sources," by G. T. Winch and H. R. Ruff. In the first paper the requirements of artificial daylight sources for critical colour matching were discussed and it was stated that practical tubular fluorescent daylight colour matching units using cold cathode tubes have been developed and are in use for industrial purposes in this country. Work is also being carried out on the use of hot cathode lamps for the same kind of work and on the use of the combination of blue fluorescent lamps with tungsten filament lamps, which, provided care is taken to maintain the proper mixture of light, is found to give better results than fluorescent lamps used on their own. The second

paper dealt with current practice in this country for the specification and colour rendering properties of light sources.

Sources and Accessories

The secretariat country for *Light Sources* is Great Britain, and the report was prepared and presented by Dr. J. N. Aldington. The report was made under four main headings (a) electric arc lamps and filament lamps, (b) electric discharge lamps, (c) fluorescent lamps, and (d) gas lamps and photo flash lamps. It dealt with the general trend of developments since 1939, and many references were made to original papers and publications. It is pointed out that progress in the different fields of development have been unequal owing to the disturbance caused by war and has been most marked where special light sources were demanded for war-time applications. On fluorescent lamps it is suggested that international standardisation of colours is of little importance at the present time and that standardisation of wattage and dimensions, where interchangeability is concerned, would be more useful.

A paper on practice in the United States in regard to fluorescent light sources and auxiliary equipment was presented by Mr. R. M. Zabel, and illustrated the range of fluorescent lamps now in common use in that country.

Mr. V. J. Francis presented a paper on the air-cooled high-intensity H.P.M.V. lamps and reviewed the development up to and including the compact source lamp. It was suggested that a design of lamp intermediate between the tubular lamp and the compact source lamp, making use of what had been learned regarding improved colour rendering from the experimental work on the latter lamp, might be possible, giving luminous efficiencies of the order of 60-80 lumens/watt.

The report on *Diffusing Materials* had been prepared by the Czechoslovakian Committee who had taken up the work which had been interrupted by the occupation in 1939. The report was largely a survey of technical literature and the only substantial discussion came from the British delegation, the principal changes being to include a study of all types of diffusing material rather than to restrict the work of the committee to opal glass. One difficulty in the discussion arose over the different meanings given to somewhat similar words in different countries; for example, the French word "opalin" has a different meaning from the English word "opal," whilst both are different from the American interpretation of the word "opal." Apart from tidying up the vocabulary, the principal items of work for the next three years are the study of the measurement of regularly transmitted or specularly reflected flux and the general problem of the classification of diffusing materials, both of which have been considered in outline in the past but have proved rather difficult.

On the *Classification of Lighting Fittings* (Belgium) the previous classification of fittings into direct, semi-direct, mixed, semi-indirect, and indirect was reaffirmed, and the British proposal that symmetric fittings be classified into extra - narrow, narrow, intermediate, wide, and extra-wide was recommended. It was also urged that the various national committees should take steps to extend the use of this classification in their respective countries, and that special study be given to the classification of asymmetric fittings before the next session.

Lighting Applications

Street Lighting was covered in a report by the American Committee

Messrs. W. T. Gemmell, E. B. Sawyer, W. R. Stevens, and R. O. Ackerley at Versailles.

Mr. L. J. Davies and others deep in discussion.

which was based on replies received to a questionnaire circulated to the other national committees. It stated that on account of the war and the many difficulties which have existed in most countries nearly all scientific research and technical developments on the subject were either stopped or greatly delayed, and replies to the questionnaire indicated that there was little new to report regarding actual accomplishments. However, studies were again being undertaken on such subjects as glare and visibility, in which fields there was much experimental work to be done.

Some countries reported progress in establishing standards for laboratory test procedures for street-lighting lanterns, whilst most countries also recognised the need for further studies and practical operating data on photometric maintenance of lanterns.

The report was also stated to include

Mr. T. D. Wakefield (U.S.A.) and Mr. C. W. M. Phillips.

conclusive data in confirmation of the claim that there is a definite relationship between adequate street lighting and a reduction in traffic accidents. The special tests which were quoted in the report were criticised and it was stressed that as there were so many different factors to be taken into consideration when conducting such visibility tests, the tests must be conducted with a very large number of "average" drivers under all kinds of conditions before any reliable figures could be quoted. The results of similar tests carried out in this country were given by a member of the British delegation who said that accident statistics had been compiled for various stretches of road over a period of two years before and two years after the lighting had been improved, the final figures showing that there had been no change in the accident rate. This result had not been unexpected, but it did not mean that in this country we did not believe in the benefits of good street lighting. It was also stated that similar tests had been carried out in Paris with the same negative result.

Some slides of recent gas street lighting installations and equipment were shown by Mr. P. Crawford Sugg. A paper on progress in fluorescent street lighting in this country was read by Mr. L. J. Davies and Mr. W. D. Sinclair. Mr. Ward Harrison said that he had been surprised at the high standard of general street lighting in this country in spite of the present restrictions, and said that the fluorescent street lighting installations were some of the best he had seen.

On *Automobile Headlamps* dicussion was mainly on the subject of passing beams, on which there are two distinct schools of thought. It was agreed that for the time being no official action be taken to exclude either of the existing types of passing beam, but that joint tests should be made with the object of reaching international agreement.

Museum Lighting was one of the subjects on which the secretariat report was not available but a very informative paper on the post-war development in the lighting of museums and art galleries was given by Mr. W. E. Rawson-Bottom. The paper gave detailed information on the installation of fluorescent lighting in a number of museums and it was stated that the use of this form

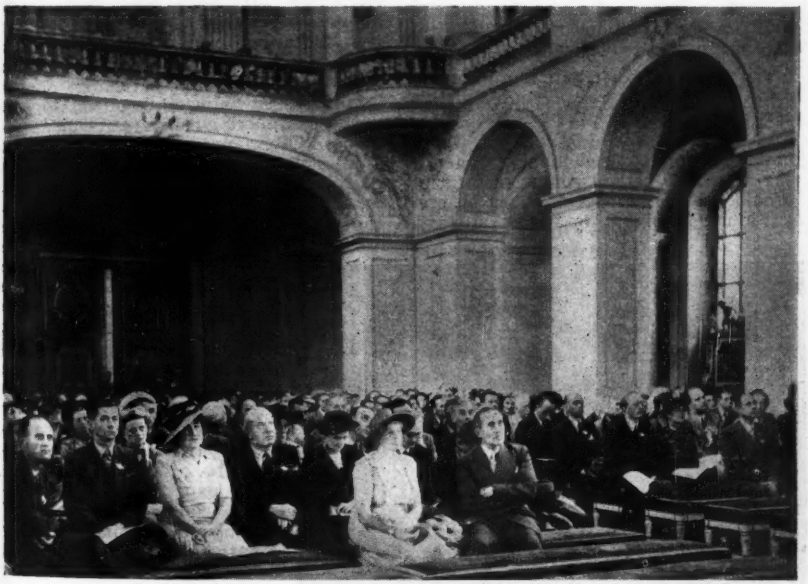
of lighting in art galleries was regarded as a definite advance.

It was recommended that national committees make a special study of the use of fluorescent lamps in museums and that attention be given to its possible effect on the life of certain museum pieces. It was also recommended that architectural lighting, which at present is included in the terms of reference of this secretariat, be considered by a separate committee as a subject on its own.

It was unfortunate that the secretariat reports on *Aviation Lighting* were not available as this subject was probably the most important one before the Commission. The meetings of the committee spread over several days. The International Civil Aviation Organisation (I.C.A.O.), with whom contact had previously been made on this subject, were represented.

On the subject of approach lights it was felt that although several nations had made substantial progress towards the solution of the problems involved, further tests should be carried out to confirm and co-ordinate the results which had so far been obtained before any attempt was made at international standardisation. The report of the Airport Lighting Evaluation Committee of the United States was recommended as the basis for proposals on the operational requirements for approach lighting systems. The Secretariat Committee for Ground Lighting (Holland) was requested to foster international co-operation in testing approach lighting systems and the principles underlying them by consulting the national committees of other nations and inviting them to witness tests.

With regard to lighting on aircraft, it was agreed that further information should be collected regarding the candle-power distribution of landing-lights, and that attention should be given to the method of determining the limits of brightness of fluorescent materials when irradiated with ultra-violet of a certain intensity and quality. It was also noted that the draft I.C.A.O. recommendations for Navigation Light Standards permitted alternatives for certain of the signals. As it was considered by the I.C.I. that such alternatives should be



The interior of the Chapel Royal at Versailles, during the concert of orchestral and organ music.

unified as soon as possible, it was recommended that the I.C.A.O. should foster experiments with the co-operation of several countries so that the results would be given an international status.

On *Traffic Signals* it was decided that the Secretariat country (Great Britain), with the collaboration of other countries, should:—

(1) study the positioning of arrow signals with a view to standardisation,
(2) prepare a survey of pedestrian signals, also with a view to standardisation,
(3) study the location of traffic signals at road junctions and specify minimum requirements,
(4) study methods of measuring the optical properties of signals,
(5) prepare a report on the distribution of intensity and of luminance of traffic signals with a view to specification,
(6) prepare a report on phantom indications and measures to counteract them, and
(7) prepare a report on the illumination of road traffic signs, other than signals; the report to include an examination of the performance of retro-reflectors.

A paper on the distribution of intensity from traffic signals was presented at this meeting by R. Pages of France.

At a joint meeting of all those interested in coloured light signals it was agreed to set up a new secretariat to co-ordinate the specifications at present in use for signals on roads, railways, and in connection with aircraft and marine work.

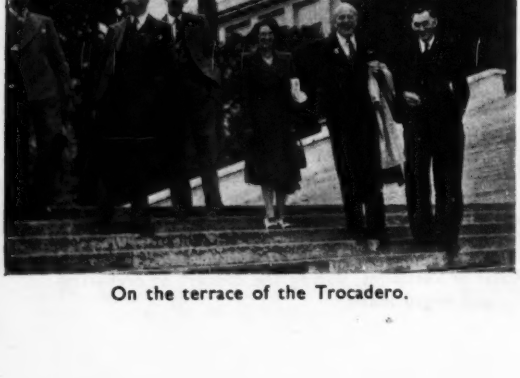
On *Natural Lighting*, the secretariat for which is this country, it was agreed to collect the fullest possible information regarding sky characteristics in the various parts of the world.

At the meeting on *Mine Lighting* a paper, entitled "The Application of Fluorescent Lighting at the Face in British Coal Mines," was presented by Mr. R. Crawford and Dr. F. W. Sharpley. The paper indicated that it is as yet too early to assess the success of mains-operated or pneumatic fluorescent lighting underground, but the reactions so far have been favourable. In those pits where the lamps have been installed the coal-face workers are enthusiastic and would not now like to be without these new lamps. The costs of operation and the effect of the improved lighting on the accident rate, the incidence of nystagmus, and on output, has yet to be ascertained, and will no doubt take some time.

Ultra-Violet Radiation

One of the chief points in the discussion on the report on *Ultra-violet Radiation* (Holland) was that there appeared to be considerable variation in the radiation from u.v. lamps when measured in different laboratories. As a result it was agreed that lamps should be exchanged between countries for the purpose of making comparative measurements. Other proposals included that studies should be made of the maximum daily "dose" of radiation at 2537A, which will produce no harmful effect on the eyes, and the extent to which the indirect irradiation of the occupants of rooms can be reduced without losing the bactericidal effect. It was also recommended that national committees should co-operate with biologists in their respective countries to determine the biological effectiveness of u.v. radiation of different wavelengths.

A paper on the production and application of germicidal radiant energy in the United States was given by Mr. Samuel G. Hibben, who reviewed experience gained in that



On the terrace of the Trocadero.

country over the last 10 years or so.

Miscellaneous

The report *Lighting Education* prepared by the French Committee was very short and gave no details of actual courses established in any of the countries. It was felt by the British delegates that the courses arranged in this country for the City and Guilds examinations might well have received mention.

Under *Lighting Practice* the report, which had been prepared by the United States, was divided into four sections: (1) School and College Lighting, (2) Office Lighting, (3) Industrial Lighting, and (4) Railway Transport Lighting. The report was one of the best presented and gave a very comprehensive survey of work which had been carried out in these fields in a number of countries.

At St. Germain. *L to R.*—A. G. Penny, W. R. Stevens, Dr. Luckiesh, Preston Millar and J. M. Waldram.

In the United States the general trend is for much higher levels of illumination than in other countries. Emphasis is also given to comfortable seeing conditions which are achieved by suitable brightness ratios (i.e., the control of the colour and reflection factors of walls, floors, furniture, etc.). It is estimated that in the U.S. there are about 1,000,000 classrooms with levels of illumination below 8 foot-candles which have yet to be relighted to the required standard. It is also stated in the report that about two-thirds of the factories in the U.S. are still inadequately lighted.

In the sections dealing with practice in this country reference is made to the recommended values of illumination given in the I.E.S. Code for the Lighting of Building Interiors. Work in recent years has shown the need for better lighting in schools, as elsewhere, and has resulted in the adoption by the appropriate authorities of recommendations for school lighting. On the industrial side attempts have been made to ascertain the effect of lighting on production, but this has proved a difficult task owing to the fluctuating conditions within industries. Reduction in accidents and in absenteeism have, however, been credited to improved lighting.

Progress in these fields in other countries has been on somewhat similar lines, though it has been held up by the war years when fluorescent lamps were unobtainable. Developments are now being made, the levels of illumination which are adopted being nearer those in this country rather than in accordance with practice in the United States.

On transport lighting some useful information is given the latest developments being mainly on the use of fluorescent lamps. Reference is made to the lighting of railway stations and to the use of both cold and hot cathode fluorescent lamps in this country for that purpose. Details are also given of current practices on the lighting of railway marshalling yards, from which it would appear that the levels of illumination on those in Switzerland are much higher than in other countries, and reference is made to tests carried out on high tower lighting in Great Britain.

A paper on Comfortable Lighting was presented by Mr. Ward Harrison in which he pointed out that lighting systems at higher levels of illumination require greater care in design to avoid objectionable glare. A paper on the fundamental concepts underlying lighting for prolonged critical seeing was given by Dr. Matthew Luckiesh who emphasised that light and vision are only the tools for seeing and said that a science of seeing, encompassing many specific sciences such as lighting, vision, typography, etc., was now being evolved. He said that brightness-levels of tasks were assuming more importance as the limitations of the foot-candle were

realised and that "brightness engineering" was becoming the chief thing in lighting practice. Further papers were given by D. Vermeulen and J. De Boer, of Holland, on the admissible brightness of lighting fittings, and by Dr. A. A. Kruithof (Holland) on the chromatic aberration of the eye and its influence on the design of modern light sources.

The report on *Cinema Lighting* (United States) included the interior lighting of cinemas, light on the screen and film studio lighting.

The discussion showed that there was no apparent technical reason why the general level of auditorium lighting should not be raised and that the reflection factor of a cinema screen may be reduced by as much as 50 per cent. due to bad maintenance and the collection of dust and dirt.

The recommendations were (1) that a complete study should be made of the contrast between screen and auditorium lighting in order to ascertain the correct balance, the level of auditorium lighting necessary to enable patrons to see properly on entering the cinema and the desirability of decreasing the general lighting nearer the screen; (2) that a study be made of the use of colour filters and colour lighting for colour photography and the use of fluorescent materials; (3) that a study should be made of the various types of cinema screen in use throughout the world; (4) that an attempt should be made to bring into general use an instrument for measuring screen brightness, and (5) that attention should be directed to the necessity of keeping the screen clean.

Theatre Lighting was covered in a report prepared by the British committee and dealt mainly with light sources and control equipment rather than on the lighting problems themselves. It was decided that further information should be collected regarding the spectral distribution of filters used for stage lighting in the various countries and that the dimensions of projector lamps for stage lighting be standardised internationally. It was also recommended that lamps with pre-focus caps and holders be adopted by all countries.

The Final Session

At the closing plenary session on Wednesday, July 7, Dr. N. A. Halbertsma was re-elected as President of the I.C.I., the remaining officers being as follows:

Hon. Vice-President:
Sir Clifford Paterson.

Vice-Presidents:
Dr. J. W. T. Walsh (U.K.)
M. Maurice Leblanc (France).
Mr. Ivor Folkar (Sweden).

Hon. Treasurer:
Dr. H. Koenig (Switzerland).

Hon. Secretary:
Mr. C. A. Atherton (U.S.A.).

The election of Mr. C. A. Atherton as honorary secretary means that the work of the Central Bureau, which has always been carried out at the N.P.L. at Teddington will now be taken over by the United States.

The next meeting of the commission will be held in Sweden in 1951.

* * *

Social Events

The concluding section of this article is a rather more personal account of the social activities organised in connection with the I.C.I. meeting and begins with our departure from London on June 29.

In 1770, Oliver Goldsmith writing to Sir Joshua Reynolds after crossing to France said: "We had a very quiet passage from Dover to Calais which we performed in three hours and twenty minutes, all of us extremely seasick, which must necessarily happen as my machine to prevent seasickness was not completed." Whether he completed his "machine" or not I don't know, but I don't think any of us suffered at any time whilst we enjoyed the excellent service provided by the British and French railways on our trip from London to Paris.

At Victoria Station before departure

The main party left Victoria in the Golden Arrow at 10 a.m. and arrived at the Gare du Nord in Paris at 5.30 p.m.

I might perhaps again quote from the same letter by Goldsmith who, describing his arrival at Calais, said that he and his friends "were in high spirits at coming to Calais, where we were told that a little money would go a great way. Upon landing two little trunks, which was all we carried with us, we were surprised to see 14 or 15 fellows all running down to the ship to lay their hands upon them; four got under each trunk, the rest surrounded and held the hasps, and in this manner our little baggage was conducted with a kind of funeral solemnity till it was safely lodged at the Custom House. We were well enough pleased with the peoples civility till they came to be paid; every creature that had the happiness of but touching our trunks with their finger expected 6d., and they had so pretty civil a manner of demanding it that there was no refusing them."

Informal group at Victoria station.

That was almost 180 years ago—and still to-day the porters will pass your baggage from hand to hand and demand in "so pretty civil a manner," not 6d., but 100 francs, which is the smallest note your bank has given you. There are perhaps other statements in the above quotation which were true in Goldsmith's day but which are no longer true—as for instance the remark that a little money will go a great way, whether it be in Calais or elsewhere.

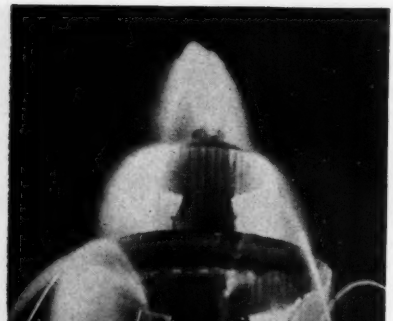
However, after a comfortable journey we arrived in Paris and were met by Mr. McDermott and M. Jean Chappat and other members of the French committee.

As delegates were expected to register on that evening at the Maison de la Resistance Alliée in the Rue François 1er, the party was hustled along there, taking the Grand Hotel in their stride.

There were so many people at Rue François 1er, however, that most delegates decided to leave the business of registration until the following day. It is possible that the French committee themselves were surprised at the number of people at this first informal reception; but, even so, they managed to get about 300 people into a room designed to take 100 without any apparent worry. In fact one might say that the representatives of the 17 nations present fell into one another's arms the moment they met.

The following evening a tour was made of the floodlighting which had been arranged in Paris in honour of the commission. It so happened that this same evening had been chosen for a big show in aid of the United Nations Children's Fund, and it seems to have been generally assumed that the floodlighting was all part of that. However, it was a worthy cause and the effect was the same.

From the crowds on the streets it seems that all Paris was inspecting the lighting and it was very nearly impossible to make any progress in the motor coaches along the Champs-Elysées as it was a solid block of cars and pedestrians from the Arc de Triomphe to the Place de la Concorde. Though the tour took longer than was expected, delegates were able to see some outstanding examples of floodlighting. The Arc de Triomphe attracted attention owing to the way in which the lighting equipment had been sunk into the ground so that the light sources were normally invisible. A fine effect was also achieved at the Opéra where the façade was floodlit with tungsten lamps from the front and with neon tubes from behind. Other places included the Louvre, Notre Dame (floodlighted by means of several batteries each of 40 or 50 projectors on neighbouring buildings),



One of the floodlit fountains in the Place de la Concorde.

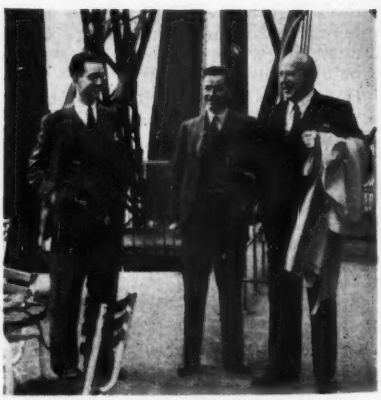
the Eiffel Tower, the Madeleine, and the fountains in and the buildings facing the Place de la Concorde. Before the war the city was floodlighted every night, but now, as in this country, the fuel situation permits floodlighting only on very special occasions.

The attention of the British delegation was also attracted to the lighting of the Paris shop windows and to the electric signs, aspects of lighting with which we have tended to lose familiarity, though not appreciation, during the last few years. Perhaps the ladies were more interested in this than the men, but there is no doubt that it was a most refreshing sight for all and it is to be hoped that it will not be long before we can make our cities as attractive by night as the French have made Paris.

After seeing the lighting the delegates were entertained at a dance given by the Association Française des Eclairagistes, at "Ledoyen" on the Champs-Elysées. This was the first opportunity for all the delegates and their ladies to get together as there had been little chance on the previous evening. The dance did not begin until just before midnight but the hospitality was such that it was a very late hour before the last representatives of the British contingent left the party and found their way back to the Grand Hotel.

As was only to be expected, a great effort was needed the next morning, Thursday, July 1, to get the meetings at the Rue François 1er by 9.30, but the committee rooms were filled. No doubt many delegates envied the ladies, who had no commitments until 3.30, when they attended a mannequin parade at one of the leading Paris fashion houses. At this the ladies learned all about the newest in "new looks" but fortunately for their husbands the limited allowance of French francs did not permit any buying.

By this time, having been in Paris for 48 hours, the British delegates had found their feet and had mastered not only the Métro (with its "mileage" of 150 kilometres) but also the Paris traffic and the whistles of the Serjeants de Ville. It did not take us long to discover that the least unnerving method of traveling by taxi was—once having given the driver your instructions in the best French you could muster—to shut your eyes and open them again only when you reached your destination. To say that we had "mastered" the traffic is perhaps a little sweeping—rather I should say that we had learned how to negotiate the streets and boulevards. The reason why there were not more accidents was discussed but never found, though a representa-



G. F. Cole, J. N. Aldington, and W. J. Wellwood-Ferguson on the Eiffel Tower.

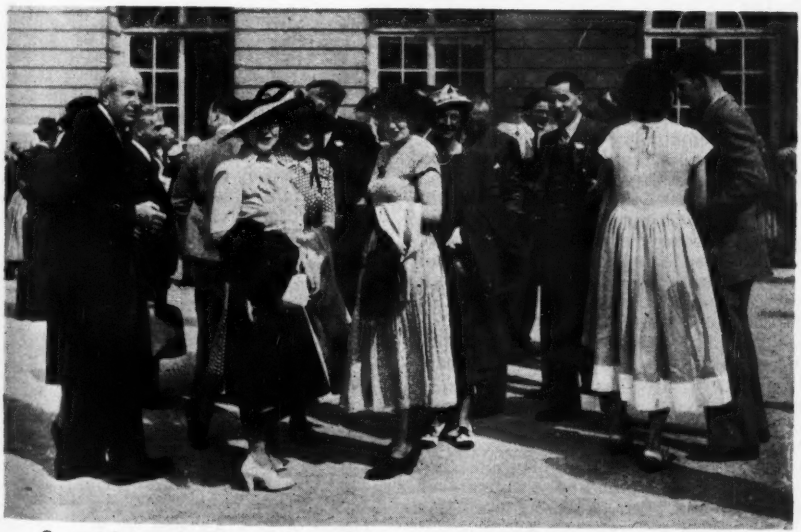
tive from the Ministry of Transport was heard to say that the 'buses must be made of rubber. But anyone wishing to test his nerve as a pedestrian would do well to walk across the Place de l'Etoile or the Place de la Concorde—though any of the smaller "ronds points" is sufficiently exciting for me.

In the evening a visit was paid to the Louvre to see the lighting, after which the delegates and ladies were received at the Hotel de Rohan by Madame Maurice Leblanc and the Ladies Committee. The Hotel de Rohan was built in 1719 by the Cardinal of Rohan and was taken over by Napoleon in 1808 to house part of the national archives. At this reception a most successful attempt was made to recapture the magnificence of the early days in the history of this building for, to add colour to the already beautiful eighteenth century rooms, the sons and friends of the French committee were dressed in the style of that period and waited upon the guests. The scene could best be described by colour film, the most beautiful scene being the wide stone staircase on either side and on each step of which the attendants holding lighted candelabra stood as the guests arrived and were received at the head of the staircase.

The next day, Friday, July 2, the ladies made a tour of Paris in the afternoon, and in the evening we all had supper under the trees at the Place du Tertre in old Montmartre. The Place du Tertre is the centre of the original village of Montmartre and still retains the appearance of an old French country town rather than that of Paris. Most people made their way there by coach, but others, taking advantage of the fine evening, walked up the hill and were able to enjoy the view over Paris.

The highlight of the week-end activities was the garden party at the Palace of Versailles on the Saturday afternoon. The present building was begun in 1664 by Louis XIV, and the first part of the entertainment was a concert of French orchestral and organ music held in the Chapel Royal, the building of which was completed in 1710. This magnificent chapel was an ideal setting for the concert. The orchestra was conducted by Monsieur Felix Raugel and the organ was played by Monsieur Andre Marchal and Mademoiselle Micheline Lagache.

After the concert a tour was made of the apartments of the Palace. One of the most noticeable features of this was the



Group taken at the Palace of Versailles showing Dr. and Mrs. Wellwood-Ferguson, Mrs. H. C. Weston, Mrs. J. G. Holmes, Dr. and Mrs. J. N. Aldington.

richly decorated ceilings from which some of the painted figures seemed to be suspended instead of being painted on the flat surface. We also saw the Hall of Mirrors which is 250 feet long and 30 feet wide, being lighted by 17 large windows each of which is faced by a mirror of the same size. This room is probably the scene of more historical events than any other in the world and it is here that the peace treaty of 1919 was signed.

After leaving the Palace we walked through the Great Avenue, which leads to the Trianon, and were able to admire the gardens and the numerous fountains which are placed to give such surprising effects. Later in the evening we had dinner in the Orangerie and were then entertained to a programme of music and ballet given by artistes of the *Corps de Ballet* de l'Opera.

On the Sunday afternoon we took part in a coach tour of the environs of Paris making the first halt at St. Germain where we were able to stretch our legs on the famous terrace bordering the forest of St. Germain and overlooking the Seine. Later in the evening we stopped at the Chateau de la Malmaison which was formerly occupied by Napoleon and the Empress Josephine. It appears that shortly after her marriage to Napoleon, and whilst he was away at a campaign as a comparatively junior officer, Josephine, who had always wanted to live at Malmaison, bought the Chateau with rather limited funds promising that Napoleon would pay the remainder when he returned. We were told that Napoleon was "a little bit cross" when he discovered what had been done in his absence but he paid up, as most husbands do, and they lived there very happily for many years. The Chateau is now maintained as a museum with relics associated with Napoleon and Josephine, and many of the rooms, such as that in which Napoleon spent his last hours in France before exile, are still as they were during his lifetime.

On the Sunday evening we returned to Versailles once more to see the illuminations and fireworks at the Basin de Neptune. It was unfortunate that the weather, which had been so fine over the week-end, should change on this evening but in spite of a torrential downpour we were able to see some magnificent colour floodlighting, in particular that of the fountains. The conjunction of floodlighting and the firework display was a truly magnificent piece of stage management.

On account of the limited accommodation only a few delegates were able to take part in a further excursion round Paris on the following evening during which they were able to see the Abbey de Chalis. The party had supper at the Abbey de Royaumont, which was originally founded in the thirteenth century and which during the revolution was used as a textile mill. The Abbey is now used as an international cultural centre and it was in part of the building that is now used as a library, which is illuminated entirely by candles, that the party were entertained to supper. After supper the Curator of the Abbey expressed his welcome to the party, and in the course of his reply Dr. Halbertsma gave a most amusing discourse on the candle, linking his remarks with the new name of the international candle (the candela).

The last social event arranged by the French committee was a reception at the Paris Town Hall given by the Paris Municipality on the evening of July 6. This building is one of the show pieces of Paris. The original building was constructed in 1628, and was reconstructed between 1874 and 1882 though retaining much of the splendour of the original building.

This series of social events was greatly appreciated by the delegates from all nations who congratulated the French committee on the excellent organisation with which they had been carried out. It is only right also that mention should be made of the charm and efficiency of

Messrs. A. D. S. Atkinson, W. E. Drake, and N. Boydell "at home."

the young ladies who, under Monsieur H. Hamilton, went to so much trouble to get delegates into the coaches at the right place and the right time, and who were so very helpful in explaining the various places which we visited. Thanks are also due to MM. Garrabos and Bergeron and Mlle. Jung for all their help in supplying us with tickets for the various events. They were responsible for the Information Bureau at the Rue François 1er, and had many other duties to perform in addition to attending to our requirements for tickets for the social side.

On the evening of Tuesday, July 6, as most delegates were leaving Paris the following day, the foreign delegates entertained their French hosts to dinner on the Eiffel Tower. Dr. Halbertsma, on behalf of all the overseas delegates, expressed their great appreciation to the French committee for their excellent hospitality, and made presentations to the members of the French Ladies' Committee.

Other speeches were made by Mr. Preston Millar, leader of the United States delegation, and Dr. S. English, leader of the British delegation. Prof. J. C. van Staveren, of Holland, spoke for the Dutch delegates, saying that all the overseas visitors had come to Paris as foreigners, but even in the short time available they had been made thoroughly at home and felt that they had become true Parisians. The last speech was from Dr. A. Meyer, of Berlin, who expressed the gratitude of himself and his colleagues from Germany to the French committee for their kind invitation to take part in the proceedings of this session of the I.C.I.

Natural Lighting In Factories

An excellent bulletin entitled "The Natural Lighting of Industrial Buildings" (Factory Planning, Pt. 11) which has been prepared and published by the Industrial Welfare Division of the Department of Labour and National Service of Australia, has recently been received in this country.

The Introduction to the bulletin states that in a country so well endowed with sunlight and space as Australia the effective use of natural lighting may mean enormous savings to industry and a very considerable improvement in working conditions; few buildings, however, will stand critical analysis of the natural lighting design.

In 1944 the Standards Association of Australia undertook the work of creating reference standards on the subject. Specialist information was not available in Australia though a great amount of technical data was available from other countries such as the U.K. and U.S.A., and the Industrial Welfare Division undertook the large scale investigation of conditions in Australia which was obviously required. The work was closely linked with that on natural ventilation, and the bulletin presents the results of work to date on natural lighting.

The bulletin comprises a very good summary of the work that has been done on the subject and gives references to British and American literature. It includes a survey of current practice in Australian factories and an analysis of the influence of increasing standards of lighting upon the constructional costs of typical north-light (or south-light) roofed factories.

Tribute is paid to the work of the D.S.I.R. in this country, which led to the development of daylight-factor protractors. These are now available in Australia, and it is strongly recommended in the bulletin that all concerned with the design of buildings make use of them.

A feature of the bulletin is what is perhaps the first attempt to produce a schedule of daylight factors needed for various industrial tasks. The schedule, in an appendix, covers a number of industries and processes of which the following may serve as examples—

Assembly Shop:—	
Rough work ...	1 per cent.
Medium work ...	2 per cent.
Fine work ...	3 per cent.
Extra fine work	Over 5 per cent.
Drawing:—	
Rough drawing & sketching ...	3 per cent.
Prolonged close work and design in detail ...	Over 5 per cent.

Courses in Illuminating Engineering

A number of courses in illuminating engineering have been arranged to take place during the educational year beginning in September by several technical colleges both in London and in the provinces. These follow the successful series of courses which were held last year, when a record number of students took the examinations of the City and Guilds of London Institute. Details of the courses are given below.

It is gratifying to note that the part-time day and evening courses which were introduced last year are to be continued, and it is hoped that wherever possible employers will grant facilities for members of their staffs to take advantage of this.

LONDON.

The Borough Polytechnic (Borough-road, S.E.1).—Two courses have been arranged for students wishing to take the Inter. Examination in May, 1949. The first is a part-time day and evening course, which will be held on Thursdays from 2-4.30 p.m. and 4.50-8 p.m. The other is an evening course, which will be held from 6.30-9 p.m. on Tuesdays and Fridays. One additional evening per week can also be taken by students wishing to qualify in ancillary subjects such as mathematics or machine drawing. A course for the Final City and Guilds Examination (Section "A" and/or "B") will also be arranged, provided there is sufficient demand.

The fee for courses is about 30s. Students may enrol between September 20 and 22, the courses beginning on September 27. Fuller details and prospectus may be obtained from the Principal of the Polytechnic.

The Northampton Polytechnic (St. John-street, E.C.1). — Students are offered, for both the Inter. and Final City and Guilds Examinations, the choice of either a part-time day and evening course or a wholly evening course. The evening course for the Inter. Examination normally extends over two sessions, but students sufficiently well prepared may be admitted direct to the second year. The Final Grade course will be for either Section "A" or Section "B," depending on enrolments. In connection with all courses additional classes in mathematics and physics are available for students needing supplementary instruction in these subjects.

The times of classes are as follows:—

INTERMEDIATE GRADE.

(a) Part-time day and evening course: Wednesdays, 2-5 p.m. and 6-8.30 p.m.

(b) Evening course:
First year — Mondays and Thursdays, 7-9.30 p.m.
Second year — Mondays and Wednesdays, 7-9.30 p.m

FINAL GRADE.

(a) Part-time day and evening course: Thursdays, 2-5 p.m. and 6-8.30 p.m.

(b) Evening course: Tuesdays and Thursdays, 7-9.30 p.m.

Enrolment week is September 13-17, but students interested in these courses are asked to write to the Principal of the Polytechnic as soon as possible.

CARDIFF.

Cardiff Technical College.—The course, which is being resumed on September 20, is the second part of a two-year course for students wishing to take the Inter. City and Guilds Examination in May, 1949. Students also have the option of taking a third year to sit for the Final Grade examinations. The course is to be held on Mondays from 2-5 p.m. and 7-9 p.m. The enrolment week is September 13-20, and further details may be obtained from Dr. S. Vernon, Physics Dept., Technical College, Cardiff, or from Mr. N. D. Houston (Hon. Sec. of the Cardiff Centre), 54, St. Mary-street, Cardiff. The fee for the course is 50s.

It is of particular interest to note that a new department in illuminating engineering, with a specially equipped laboratory, has been set up by the college, and it is intended to continue courses as a regular feature of the college curriculum.

LIVERPOOL.

Bootle Technical College (Balliol-road, Bootle, Liverpool, 20). — This course is for students wishing to take the Inter. Examination and begins on September 27. Classes will be held on Monday, Wednesday and Thursday evenings, the fee being 15s. Enrolment will take place on September 16 and 17, between 6 p.m. and 8 p.m. Further details may be obtained from the Principal of the College.

Details of courses in other centres are not yet available.

Obituary

SIR CLIFFORD PATERSON, 1879-1948

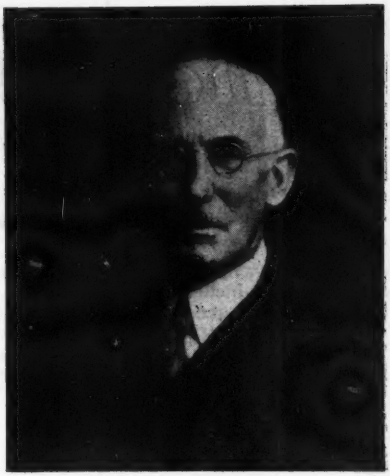
It is with deep regret that we announce the death, on Monday, July 26, after a short illness, of Sir Clifford Paterson, at the age of 68.

Sir Clifford will be mourned by lighting engineers not only in this country but throughout the world. He was well known and liked by members of the Illuminating Engineering Society, of which he was one of the original members.

Clifford Copland Paterson was born on October 17, 1879, and was educated at Mill Hill School, after which he studied at Finsbury Technical College and Faraday House. In 1901 he went to the National Physical Laboratory, where he became responsible for the Electrotechnical and Photometric Departments.

He was always interested in industrial research, and in 1919 he joined the General Electric Company to establish and direct their research laboratories, the main work at that time being research on light sources. Under his guidance the laboratories have been expanded to cover many other branches of electrical research, and the original staff of 29 has now become over 1,200, the laboratories being the largest of their kind in the country. He was appointed to the board of the G.E.C. in 1941 and received his knighthood in 1946.

It is, perhaps, difficult to realise that when Sir Clifford took over his work at Wembley the incandescent lamp was still a rather uncertain product whereas it is now the most simple and stable of our light sources. Under his active guidance much work has been done on light sources and on the principles of lighting, and it is a feature of the team which he has built up that close contact was always maintained with the practical applications of their work. Sir Clifford was always prepared to help with other researches which may not perhaps have come within the normal work of his laboratories, and in this way he has given great help in connection with problems which had from time to time been brought before other bodies, including the I.E.S.



Sir Clifford Paterson

Sir Clifford always took a very keen interest in the activities of the I.E.S., to which he presented many papers and contributions and was president during 1928-29. He was also a Past-President of the Institution of Electrical Engineers, of the Institute of Physics, and of other scientific bodies. He was chairman of the Council of the B.S.I., and a member of the Advisory Committee of the D.S.I.R. He was also chairman of the D.S.I.R. Lighting of Buildings Committee, whose report in 1944 has done so much to bring together the architectural and lighting professions. He gave valuable service to the country during both the first and second world wars, for which he was awarded the O.B.E.

He was awarded many honours, including Fellowship of the Royal Society, but he regarded these distinctions not as personal ones but as representing the achievements of the team which he led. The last of his many honours was the award of the Gold Medal of the I.E.S. of America, which was presented to Lady Paterson only on July 23.

Sir Clifford, who had just returned from Australia, where he had acted as a contact between scientific bodies there and in this country, was taken ill just before his return to England. The sympathy of his many friends will go to Lady Paterson in her sad loss.

The EDITOR Replies

We are always glad to receive *photos of events* in which I.E.S. members participate, and accordingly reproduce herewith the picture sent us by Mr. H. S. Allpress—which relates to a pleasant incident that happened some time ago, i.e., the visit to Chislet Colliery, near Canterbury, on May 11. (See LIGHT AND LIGHTING, June, 1948, p. 116.)

A group of I.E.S. members on the way to Canterbury on May 11th.

The widely expressed belief that a fluorescent lamp yielding light of a colour *intermediate between "daylight" and "warm white,"* to which reference has been made several times in these columns, has now been justified. We record elsewhere the announcement of the E.L.M.A. that such "Natural" lamps will be marketed from September 1 onwards. It is expected that the new lamps will find special applications in shops and stores.

The comparative merits of *indirect and semi-indirect lighting* are often discussed, without, perhaps, any very clear idea of the distinction between these modes of lighting, which shade into one another. One suggestion in favour of semi-indirect units is that the shadow line cast on the upper parts of walls by the edge of the fitting is softer and less evident than that cast by an opaque fitting, such as is used in indirect systems.

It should be remembered, however, that there are two effects involved—that of the direct rays cast by the source and that of the light reflected from the ceiling. The latter tends to soften direct shadows and may be the paramount influence—for the amount of light thus reflected is naturally a maximum with indirect lighting. Incidentally, this was well illustrated in two pictures showing the same interior lit by indirect and semi-indirect means, presented by Mr. Jervis in his paper at the I.E.S. Summer Meeting. In that case the shadow was apparently least marked with the indirect system.

The holding of the Olympic Games reminds one of the suggestion, not infrequently repeated when the football season is in its midwinter stage, of a completely covered in and artificially lighted arena, where football matches can be played independent of natural lighting or outside weather conditions. The use of exterior floodlighting to enable matches to be played outdoors at night is never quite successful, and does not seem likely to become general.

Things would, however, be different in the case of a well-lighted and properly designed indoor arena. I am told that there is only one place in the world where this need has been satisfactorily met—at Helsingfor, Finland, where the alternative of outdoor football matches,

or matches played indoors by either natural or artificial lighting is offered.

Colour now enters into so many things. I am indebted to Dr. W. R. G. Atkins for drawing my attention to a recent note in *Nature* referring to a report by the Air-Sea Warfare Development Unit on "*The optimum dinghy colour for air-sea rescue.*" Yellow, orange and red were tried and experiments were made both in British waters and in the Mediterranean. On the whole, yellow seems to have turned out best. But besides adopting the best colour, *size* is important. It can, of course, be increased by field-glasses, when available. But a possibly more effective plan might be to liberate a good-sized patch of highly coloured oil —which spreads on water at the rate of 12 miles per minute.

Lighting at a Greyhound Track

A new blended lighting scheme has been installed at the Greyhound Track, Taunton. The floodlights were specially designed by the Brighton Lighting and Electrical Engineering Co., Ltd. For each unit Philips Electrical, Ltd., supplied two 500-w. tungsten lamps and one MA/V 400-w. mercury lamp with the auxiliary gear. The installation was supervised by Messrs. F. J. Lock and C. M. Pascoe, of Taunton.

Thirty-six units are installed, 36 to 40 ft. apart, and mounted 18 ft. high,

resulting in high intensity illumination with a crisp daylight effect and an economic consumption.

The picture shows a section of the track. The wide distribution of light ensures freedom from glare.

Mek-Elek Industrial Lighting Units

In spite of all advances in general industrial lighting, there remain opportunities for well-designed and adjustable local units, amongst which those offered by Mek-Elek Engineering, Ltd., are in a special class. Visitors to the Machine Tool and Engineering Exhibition had a good opportunity of judging the high adaptability conferred by the epicyclic geared joint, providing 360-degree movement. Special attention has been given to ease of installation and maintenance. Units are available for floor, bench, wall and ceiling mounting; or as portable units or for attachment to machines.

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VENNER TIME SWITCHES. Approx. 300 50-amp., type MSCS; and 75 ditto, type JCS, above being synchronous motor types, in almost new condition. Also approx. 300 50-amp, hand-wound (40-day) type C.S. and a quantity of 100-amp. "Oil-bath" switches, various types. — Kippax Bros., Boot-street, Burnley, Lancs.

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Lighting in a Public Library

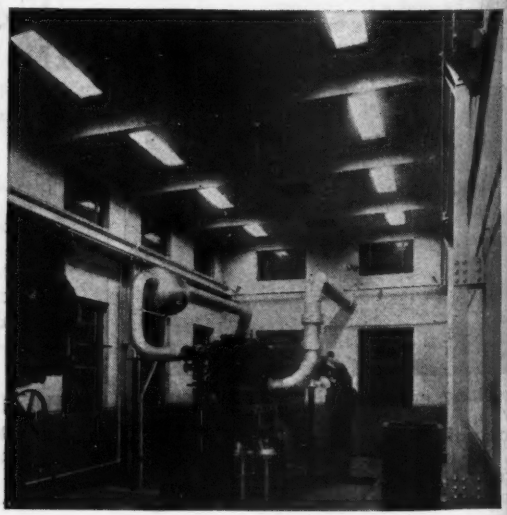
The new Westminster City Library, which was opened on July 15, is an example of how close collaboration between architect, lighting engineers and electrical contractor can result in a lighting scheme becoming an integral part of the decorative scheme.

The book rooms are arranged on two floors, totally-enclosed ribbed "Perspex" fittings being chosen for the general lighting. The illustration shows the ground floor and first floor gallery, the vertical illumination on the backs of the books averaging 10 lumens per sq. ft.

All the lighting equipment for the library and administrative offices was manufactured by Thorn Electrical Industries Limited. The electrical installation was carried out by Messrs. Drake and Gorham, Limited. The architects were Messrs. Riches and Blythin.

Lighting in a Compressor House

A recent interesting G.E.C. industrial lighting installation is in a building housing compressors responsible for 80 per cent. of the coal-gas used in the Cardiff area.

It was required to illuminate the interior of the building at an average intensity of 15 lumens per sq. ft., but owing to the product handled, the fitting had to be gasproof. Special units, each housing three 80-watt fluorescent lamps, were designed and installed.

As the building was flat-roofed, openings of suitable dimensions were cut through the roof, to take the specially designed reflectors. These apertures were glazed with armour plate glass. Weatherproof housings were then constructed over the reflectors and the apertures and the whole design was such that all maintenance could be done from the roof. The illustration of the interior of the compressor house photographed at night shows the layout of the fittings and the general effect produced.